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Citizens' Nuclear Information Center

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Monju Restarted for the First Time in 14 Years

Demonstration on the Shiraki Kaigan Beach in front of Monju, April 18, 2010

On May 6, at 10:36 am, Japan's Monju Prototype Fast Breeder Reactor (280 MWe) began test operations for the first time in 14 years. The reactor reached criticality precisely two days later on May 8 at 10:36 am. Japan Atomic Energy Agency (JAEA) plans to gradually raise Monju's power output to 40% in 2011 and 100% in 2012. Full-fledged operations are scheduled to begin in the spring of 2013.

The day Monju was restarted, CNIC issued the statement on pages 2 and 3 of this issue of NIT. A couple of weeks earlier, on April 18, over 500 citizens from Fukui Prefecture and throughout Japan gathered on the beach in front of Monju to protest the proposed restart, but their voices were ignored.

Reflecting the fact that Monju and the nuclear fuel cycle program of which it is a key part are not just a Japanese problem, on May 21 a letter endorsed by ... leading peace and environment groups from around the world was delivered to official delegates to the Nuclear Non-Proliferation Treaty Review Conference in New York. The letter urged delegates to:

1) Call upon the Government of Japan to abandon its fast-breeder and reprocessing program.

2) Support a Comprehensive Fissile Material Ban that includes civil plutonium programs.

The full text of the letter and a list of endorsing groups is available on the following page of CNIC's web site:
http://cnic.jp/english/topics/cycle/fbr/restartnpt21may10.html

On April 26, immediately before Monju was restarted, there was yet another false alarm from a sodium leak detector. (See NIT 126 for information on previous occurrences.) But JAEA was determined to restart the reactor, and Fukui Governor Issei Nishikawa was not about to jeopardize the promises he had just received from the central government about "economic incentives" and extension of the Hokuriku Shinkansen (bullet train) Line to Fukui, so he gave his approval as scheduled on April 28.

Predictably, problems arose immediately after Monju was restarted. On the night of May 6 a radioactivity leakage detector malfunctioned. The problem recurred several times the following morning, but JAEA did not report the matter to the local authorities until about noon on May 7. The fact that the announcement of the first alarm sounding was delayed by half a day prompted Nobuaki Terasaka, director-general of the Nuclear and Industrial Safety Agency, to summon Japan Atomic Energy Agency President Toshio Okazaki and issue him a verbal warning.

Problems did not end there. On May 8 and 9 a temperature alarm *Continued on page 3*

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Statement of Protest Against Recommencement of Monju Test Operation

Citizens' Nuclear Information Center* is deeply concerned about the grave risks involved with the restart of the Monju Prototype Fast Breeder Reactor (FBR).[1] Safety, economic and nuclear proliferation issues are being ignored for purely bureaucratic reasons.

Safety Issues

Monju has been shut down since a sodium leak and fire in December 1995. Over the ensuing fourteen years equipment and piping has aged. Modifications have been carried out, but the fundamental safety problems remain. The restart of Monju entails the inherent dangers of a run away chain reaction and a serious accident caused by leakage of the molten sodium coolant.

Even after safety checks were supposed to have been completed, there were repeated false alarms from Monju's sodium leak detectors. This is one of the reasons why restart has been delayed by over two years. The false alarms and the delay in reporting them highlighted the organizational problems of Monju's owner-operator, the Japan Atomic Energy Agency (JAEA). In particular, the false alarms revealed deficiencies in JAEA's quality control system. JAEA's inability to sort out these problems proves that the measures taken since the plant was shut down were desktop exercises that failed to resolve the underlying problems with JAEA's organizational culture.

JAEA says there are no problems with Monju's equipment. However, the inspections were insufficient to justify this claim. Visual inspections were carried out on only a small fraction of the inside of Monju's extensive piping. Furthermore, only one fuel assembly was inspected and even then only external visual inspections were conducted to confirm that there were no penetrating holes. Individual fuel pins were not checked.

Serious questions also remain regarding seismic safety. As a result of changes to the seismic safety assessment system, two active faults below the Monju site that were previously denied have now been recognized. In response, JAEA raised the predicted "design basis earthquake ground motion".[2] However, Monju was built 20 years ago to meet a design basis that was set 30 years ago. JAEA says the revised assessment is based on the real strength of the buildings and equipment, but the fact is that the safety margin has been reduced.[3]

Doubts also remain about the size of the revised design basis earthquake ground motion. In particular, uncertainties relating to (a) the fault plane, (b) the rate at which seismic energy is diffused, and (c) the vertical ground movement suggest that JAEA's estimate is too low.[4]

We are concerned both about Monju's equipment and about the culture and attitude of JAEA, the organization that operates Monju. We believe that Monju is an accident waiting to happen and that it is, therefore, irresponsible to restart the plant.

Economic Issues and the Futility of Japan's FBR Program

Even more fundamental questions arise in relation to the role of Monju. It no longer has any value as a prototype. Fundamental changes will be made in the proposed demonstration FBR to follow Monju. It is said that two demonstration FBRs will be built. What this really means is that the first demonstration FBR is being seen as a prototype. Under these circumstances, using Monju to generate electricity for 10 years is irrelevant. Restarting Monju is just a bureaucratic exercise.

Indeed, it is doubtful whether fast breeder reactors will ever be commercialized. The Japanese Government aims for commercialization from 2050. That is 80 years behind the original target of 1970, set back in 1956 in Japan's first nuclear power plan. The fact is that the 2050 target date has no basis in reality. The leading countries in FBR development have all withdrawn, because they were unable to overcome technical and economic hurdles and a lack of social acceptance. Considering the attrition of technical skills and JAEA's past record, it is hard to believe that Japan will succeed where other countries could not.

In order to become commercially viable, FBRs must become at least as economic as light water reactors. However, based on the construction costs of Monju, scaling up to commercial size would result in costs several times greater than light water reactors. Furthermore, continuing along the current technological trajectory is unlikely to produce the hoped for economies of scale.

It is profligate in the extreme to keep pouring money into the development of fast breeder reactors. The only outcome of the bureaucracy-driven fixation with this program will be technological stagnation. Other

promising technologies, such as sustainable energy, will be held back as a result of distorted research and investment priorities.

Nuclear Proliferation

It is a great irony that Monju is being restarted when unprecedented international attention is being given to nuclear security. The plutonium that will be "bred" in Japan's FBRs is "super weapons grade" material, which will be relatively easy to separate.[5] Japan is likely to find it increasingly difficult to gain international acceptance for its fast breeder program. As it is, Japan is setting a very bad example for other countries. Japan's FBR program complicates efforts to control the spread of weapons-usable materials and potential proliferators use Japan as an alibi to justify their own programs.

Protests and Demands

- We protest the restart of Monju.
- We demand that the government stop playing Russian roulette with our lives and permanently close down Monju.
- We demand that Japan withdraw from fast breeder reactor development completely.

Hideyuki Ban
Co-Director
Citizens' Nuclear Information Center (CNIC)

6 May 2010

* Founded in 1975, Citizens' Nuclear Information Center is a Tokyo-based non-profit NGO dedicated to securing a safe, nuclear-free world.

Notes

1. Monju is located in Tsuruga City, Fukui Prefecture. For background information about Monju and Japan's FBR program, see the following link:
http://cnic.jp/english/newsletter/nit134/nit134articles/monju.html
2. New seismic design guidelines were introduced in September 2006. Monju's design basis earthquake ground motion (S2 under the Old Guidelines and Ss under the New Guidelines) was subsequently increased from 466 Gal to 760 Gal. (1 Gal = 0.01 m/s^2.)
3. JAEA claims that the safety of fuel assemblies and some equipment and piping will be confirmed based on consideration of time history waveforms. However, there is no empirical seismic data for the Monju site on which to base calculations of time history waveforms.
4. (a) The upper extremity of the fault plane should be set at a depth of 3km rather than 4km. (b) The damping factor of the ground above the fault plane down to a depth of 630m should be set at 1% rather than 3%. (c) The vertical ground movement has been set at two thirds the horizontal movement. However, considering that there are active faults directly beneath the plant, a larger vertical ground movement should be assumed.
5. When FBRs are used in "breeder" mode, plutonium is produced in a blanket of depleted uranium around the core. The plutonium produced in the blanket has a concentration of 98% plutonium-239, the most convenient plutonium isotope for nuclear weapons production. It is relatively easy to separate this plutonium, because the depleted uranium blanket is less contaminated with highly radioactive fission products than regular spent fuel.

Continued from page 1 for an auxiliary cooling pipe went off. Then on May 11 a worker failed to properly insert control rods. JAEA said the worker was inserting the rods for the first time and was unfamiliar with the procedure. The operation manual had no description of the procedure, nor was the worker trained to perform the insertion.

Be they sodium leak detectors, radiation leak detectors, or temperature monitors, malfunction of the sensors that indicate that something is amiss has become routine. JAEA acts on the assumption that they are all false alarms. One is reminded of the story of the boy who cried wolf. Who will believe when the alarm is for real?

JAEA claims that none of these problems affected safety, but we are waiting on tenterhooks to see what goes wrong next.

Philip White (NIT Editor)

KK-1 Moves Closer to Restart

On May 11 Niigata Prefecture's technical committee on safety control of nuclear power plants endorsed the restart of the Kashiwazaki-Kariwa (KK) Unit 1 (BWR, 1100MW). KK-1 was shaken most (680 Gal*) and incurred the most damage (695 cases) of all the seven KK units during the Chuetsu-oki Earthquake in July 2007. It is also the oldest unit, having operated for 22 years at the time of the earthquake. However, before it can be restarted, a meeting must be held to explain the situation to the Niigata public. Also, the governor of Niigata Prefecture and the mayors of Kashiwazaki City and Kariwa Village must give their approval.

The central government's Nuclear Safety Commission gave its blessing on April 15, saying that in regard to equipment integrity and earthquake resistance there were no safety problems. However, at the time, serious issues were still being debated by a subcommittee of Niigata Prefecture's technical committee. The subcommittee was established after the earthquake to consider equipment integrity and earthquake resistance and safety.

The two main points of contention were as follows. First, some subcommittee members pointed out that, if there was a large earthquake, important machinery and equipment could incur strain in excess of their design basis. Tokyo Electric Power Company (TEPCO) only provided partial data in response to this concern. The other issue related to the safety margin in the event of another large earthquake. Would the control rods, which control the reactivity of the core, be inserted within the specified time? TEPCO only gave vague responses to this question.

These issues still had not been resolved when a 60 cm-long penetrating crack was found in a reinforced concrete wall in Unit 5. Naturally, local residents asked whether there were not similar cracks in Unit 1. Three more penetrating cracks were found in Unit 5 on April 27, one of which penetrated a wall that was 90 cm thick.

However, with opinions still divided and questions unresolved, the subcommittee submitted a summary of the issues discussed to the technical committee. Meanwhile, the central government was pressuring Niigata Prefecture's nuclear safety office to quickly convene a meeting of the technical committee, for which it provides the secretariat.

At the same time, the nuclear safety office was receiving lots of questions from local residents and people throughout the prefecture. In the brief period from April 30 to May 9, 82 questions were submitted. In the midst of all this came the revelation of over 500 inspection oversights at Chugoku Electric's Shimane Nuclear Power Station (see page 5). The questions submitted to Niigata Prefecture's nuclear safety office suggest that citizens have suspicions of similar oversights by TEPCO. The questions submitted can be classified under the following 13 categories:

1. Cracks in the steel reinforced concrete walls (16 questions)
2. The concrete strength used in the safety assessment (9 questions)
3. Seismic reinforcement work (7 questions)
4. Insertion of control rods (6 questions)
5. Plastic deformation (1 question)
6. Equipment integrity (7 questions)
7. Ground condition (8 questions)
8. Tsunamis (1 question)
9. Inspection oversights at Shimane (2 questions)
10. The overall assessment (2 questions)
11. Niigata Prefecture's technical committee (8 questions)
12 Concerning questions from the public (2 questions)
13. Other (13 questions)

The questions were all very reasonable. Most of them were critical of the attitude of the Prefecture and its technical committee.

At the technical committee's May 11 meeting, Niigata University Professor Kenji Suzuki was elected to replace the outgoing chair. Reports were received from both subcommittees, one looking into "equipment integrity and earthquake resistance and safety" and the other looking into "the Chuetsu-oki Earthquake and ground condition". Some supplementary explanation was also given. An engineer specializing in seismic resistance gave a one-sided presentation on why the penetrating cracks have no particular impact on safety. Members of the general public in the audience seemed to be skeptical. The committee concluded that there were no problems regarding insertion of control rods and, with virtually no substantive questions from the committee members, start-up testing of KK Unit 1 was *Continued on page 9*

Chugoku Electric's Unbelievable Lack of Awareness of Safety and Quality Control

Chugoku Electric is unqualified to operate nuclear power plants at all, let alone build a new one at Kaminoseki (see Group Introduction).

On March 30 Chugoku Electric Power Company announced that it had failed to carry out checks on a total of 123 pieces of equipment during past periodic inspections of Units 1 and 2 of its Shimane Nuclear Power Station, located in Matsue City, Shimane Prefecture. On April 30 it updated the number to 506 pieces of equipment. (It also revised the initially reported figure of 123 to 122. This is taken into account in the new total of 506.)

Unit 2 was undergoing a periodic inspection at the time. Unit 1 was shut down manually the day after the announcement. The checks found that the company failed to regularly inspect 347 items at Unit 1 and 159 items at Unit 2. In addition, the company found 1,159 other items that would not have been properly checked had its inspection program not been improved by the time the checking deadlines elapsed for these items.

The failure to carry out regular checks was only discovered when a replacement motor for Unit 1 arrived unexpectedly from the manufacturer. The motor, which drives a valve in the high-pressure feedwater injection system, was to have been replaced in 2006, but it continued to be used because an incorrect replacement order was issued. The situation was not reported to supervisors, who thought that the motor had been replaced. Only in June 2009, when a new motor arrived, did the supervisors realize what had happened. Nonetheless, they neglected to tell the inspections section until January 2010.

The fact that an incorrect replacement order was placed is bad enough. That alone shows the inadequacy of Chugoku Electric's quality control system. However, that the old part could continue to be used without any safety assessment being carried out reveals a careless attitude to safety. This and the other missed checks are totally unacceptable and very likely to be breaches of safety rules.

After the cover-ups by Tokyo Electric Power Company revealed in 2002 (NIT 92) and other cases of data falsification and cover-ups revealed in 2006 (NIT 117), electric power companies were supposed to have carried out thorough investigations. Chugoku Electric checked its records and interviewed 4,000 of its own and contractor staff. In March 2007 it reported that it had discovered many cases of malpractice: 17 cases at its hydroelectric plants, 34 at thermal plants and 29 at nuclear plants. In particular, it reported that water level data and water intake data had been forged for many years at its Doyo Dam. After the Minister for Economy, Trade and Industry issued instructions that should have been the end of such problems.

The recently discovered failures to carry out checks had been going on for many years. Yet they were not uncovered in Chugoku Electric's 2006 investigations. Inspection plans are very detailed, specifying which equipment will be checked and when, by which company. They are fitted into the overall schedule, so if checks are not carried out as specified this should be noticed at the time. Even if checks are missed, this should be discovered when records are cross-checked.

The safety rules established by the operator are covered by the license. However, the regulatory authority, the Nuclear and Industrial Safety Agency (NISA), only assesses the system (inspection procedures, implementation procedures, record-keeping system, etc.), not the details. The Japan Nuclear Energy Safety Organization (JNES) checks the operator's inspections, but it seems that JNES's checks also mostly focus on the system. It is assumed that the operator will faithfully follow its own procedures. Regulatory bodies act on the assumption that the operator is basically honest and competent, but the current case shows that the operator's inspection system was not functioning properly. It is essential to find the underlying cause of this situation.

NISA has inspected the Shimane plant and has urged other power firms to find out if regular checks are being carried out appropriately at their power plants. Chugoku Electric said that it will continue inspections and file a final report in early June at the earliest.

However, people have lost trust in electric power companies as *Continued on page 9*

Uprating Nuclear Reactors Reduces Safety

In February 2009 a working group on uprating was established within the Nuclear and Industrial Safety Subcommittee of the Advisory Committee for Natural Resources and Energy. The working group met on six occasions and released a report on March 2 this year.

The Nuclear and Industrial Safety Subcommittee's role relates to regulation rather than promotion of nuclear energy, so the report provides little explanation about the rationale for uprates. However, this can be found in other policy documents. The Framework for Nuclear Energy Policy (Atomic Energy Commission, 2005) says, "in order to achieve superior and internationally competitive performance of the nuclear power plants, it is important to promote ... research and development activities focusing on the improvement and modification of current systems and technologies such as ... safety assessment technologies to realize the power uprating." It also refers to "the pursuance of advanced utilization such as the improvement of plant capacity factor through increased flexible implementation of legal periodic inspections and extended operation cycles and power uprating."

Another policy document[1], released in June 2009 by the Advisory Committee for Natural Resources and Energy's Nuclear Energy Subcommittee, says, "Depending on movements in electricity supply and demand, [uprating] is an effective policy for flexibly raising nuclear capacity within a relatively short time period." The emphasis is slightly different, but it is clear from both this document and AEC's Framework that the purpose of uprating is to improve the performance and output of Japan's nuclear power plants.

The first reactor slated for uprating is Tokai No. 2 (BWR, 1100MW), owned by Japan Atomic Power Company (JAPCO). JAPCO is likely to apply in 2011. According to JAPCO's management policy for the 2010 fiscal year, the plant will be uprated during a periodic inspection in the latter half of 2012. However, the other nuclear power companies do not appear to be very enthusiastic. Plans were supposed to be released during the 2009 fiscal year, but they have not appeared yet.

Method of uprating

Both the thermal and electrical output of Tokai No. 2 will be uprated by 5%. When uprating is completed the plant will have an electrical output of 1150MWe.

A 5% increase in electrical output will be produced by a 5% increase in the flow of steam to the turbines. The rate of revolution of the high-pressure turbine will be increased by replacing the stationary blades with blades with a wider flow-path surface area. It is said that this is the only change required.

To increase the flow of steam to the turbines by 5% it is necessary to increase the flow of water to the reactor core by 5%. To produce extra steam it is also necessary to increase the thermal output of the core. So as to avoid the need to make adjustments to the core, more new fuel assemblies will be loaded during periodic inspections. The average uranium-235 enrichment of the fuel assemblies is 3.7%. Although the output of individual fuel assemblies will not change, the total amount of fissile material in the core will increase, thus increasing thermal output overall.

It is said that this approach will increase output with the minimum of changes. There will be no need to make major modifications, or to increase the uranium enrichment. Nevertheless, many safety issues arise as a result of the increased supply of feedwater and the increased steam generation.

Changes	Before Uprating	After Uprating
Rated Thermal Power (MW)	3293	3458
Rated Electrical Power (MW)	1100	About 1150
New Assemblies Loaded	168	180
Main Steam Flow (10^3t/h)	6.42	6.77
Feedwater Flow (10^3t/h)	6.40	6.76

Problems arising as a result of uprating

Safety-related problems include the following:

• The increased number of fission reactions will produce more radiation within the reactor building. Embrittlement of the pressure vessel due to neutron irradiation will proceed at a faster rate. This will reduce safety, especially if nuclear power plants are to be operated for 50 or 60 years.

• Replacing fuel at a faster rate will increase the amount of spent fuel. This will put extra stress on the cooling equipment of the spent fuel pools and will affect future treatment and disposal.

• Increased fission reactions will reduce the

effectiveness of the control rods and reduce their life. They will have to be replaced more frequently. This will increase the volume of waste produced.

• The increased flow of steam will cause more wear and tear and hence exacerbate wall thinning of the steam tubes. There will also be more wear and tear on the turbine blades.

• The increased feedwater flow will place extra stress on the feedwater pump.

Another problem relates to cost. Although JAPCO has not said anything so far, it can be expected that costs will rise as a result of uprating. In the first place, a 7% increase in the rate of replacement of fuel assemblies results in only a 5% increase in electrical output. Add to this the increased rate of replacement of control rods and the increased wear and tear on pipes and turbine blades and one would expect costs to rise. No wonder power companies are not enthusiastic.

The Nuclear and Industrial Safety Subcommittee's report claims that there are "basically no safety problems", but it can be seen from the problems listed above that uprating reduces the safety margin. The chair of the working group tried to defend the uprating program on the grounds of "the needs of the people". But actually it has nothing to do with the needs of the people. It is all about the needs of the government.

Uprating is one of many fronts on which Japan's nuclear safety is being whittled away. Others include extended operation cycles, life extensions for aging reactors and the use of MOX fuel in light water reactors. There is little sign so far that the Democratic Party led government will fulfill the pledge in its 2009 election Manifesto to place safety first in Japan's nuclear administration.

Hideyuki Ban (CNIC Co-Director)

1. The document's title translates literally as "policy strengthening promotion of nuclear power generation".

Japan to the Rescue of Sellafield MOX Plant

On May 12, the UK's Nuclear Decommissioning Authority (NDA) announced an agreement by which Japan would throw a lifeline to the UK's troubled Sellafield MOX Plant (SMP). SMP was originally designed to produce 120 tonnes of MOX fuel per year, but has only managed a total of a little over 10 tonnes in 8 years of operation.

According to NDA's web site, "Agreement has now been reached between the NDA and the Japanese Utilities on an overall framework for future fabrication of MOX fuel in SMP....We have reached agreement with the Japanese Utilities that will support significant engineering changes to the plant."

Ten Japanese electric power companies shipped a total of 2,864 tonnes of spent nuclear fuel to Sellafield for reprocessing and, at the end of 2009, 11.5 tons of Japanese-owned fissile plutonium was stored in the UK. This is all supposed to be returned to Japan as MOX fuel. However, due to the problems with the operation of SMP, it was thought that some of the plutonium currently stored in the UK might be sent to France for fabrication into MOX fuel at Areva's Melox Plant. Under the new agreement, if Japanese funded changes can solve SMP's problems, this will not be necessary.

The first Japanese company to have MOX fuel fabricated at SMP will be Chubu Electric, subcontracted via Global Nuclear Fuel Japan. Asahi Shimbun reported on May 13 that fabrication would begin in about 2012. However, before that can happen, an order for a German utility must be completed and engineering changes have to be made.

If history is anything to go by, the deal is a long way from being done.

Philip White (NIT Editor)

2010 Fiscal Year Electric Power Supply Plan

On March 31, the Ministry of Economy Trade and Industry's Agency for Natural Resources and Energy released the 2010 Fiscal Year (FY2010) Electric Supply Plan Outline. The plan brings together the plans of all the electric power companies. Although it is referred to as a "plan", as usual it has little relation to reality. Year after year the construction schedules for new nuclear reactors are postponed. This time the construction schedules of 8 of the 14 planned reactors have been pushed back.

For example, Tohoku Electric's planned Namie Odaka plant is an 825MW BWR that was first included in the plan over 40 years ago. There is no chance that such an outdated reactor will be built, but each year the plan is religiously postponed for another year, without ever being removed from the list.

The government's CO_2 emissions reduction plan assumes that nine new reactors will be operating by FY2020. This is the same number of start-ups as is predicted in the Electric Supply Plan. However, considering the past record, basing the CO_2 emissions reduction plan on the Electric Supply Plan is a recipe for failure. Construction of three of these nine reactors has been delayed repeatedly and there is considerable uncertainty about the other plans too. There have been reports that the government's FY2030 CO_2 emissions reduction targets will require fourteen new reactors, but given that these are the same fourteen reactors as those included in the Electric Supply Plan, relying on them to meet CO_2 emissions reduction targets borders on the absurd.

The truth is that electric power companies don't really want to build new nuclear power plants. An anonymous record of a round table discussion entitled "issues for the energy industry towards 2030" was published in the April 2010 edition of Energy Forum. An "electric power industry person" is reported to have made the following comment.

> "Since demand won't grow to match this much new capacity, presumably the financial situation of electric power companies will deteriorate. It is inconceivable that normal private companies would invest where they don't anticipate demand, but the government's CO_2 emissions reduction target is premised on the construction of nine reactors. On this point, power companies cannot be like normal private companies."

The facilitator, who was an "industry journalist", showed sympathy saying, "Under the government's 25% [CO_2 emissions] reduction scenario, if power companies continue to make huge investments after constructing these nine reactors, they won't survive without a considerable rise in electricity rates."

The nuclear power burden

The Electric Power Supply Plan predicts that the average rate of growth in peak demand (kilowatts) over the next 10 years will be around 0.4%. This figure has fallen steadily from 0.9% in FY2007, 0.7% in FY2008, and 0.6% in FY2009.

Table 1: Nuclear Power Development Plan (1)

Power Company	Location	Power (MW)	Commence(d) Construction	Commence Operations	Status	Type
Tohoku Electric	Namie Odaka	825	FY 2016	FY 2021		BWR
	Higashidoori-2	1,385	FY 2016 or after	FY 2021 or after		ABWR
Tokyo Electric	Fukushima I-7	1,380	April 2012	Oct. 2016		ABWR
	Fukushima I-8	1,380	April 2012	Oct. 2017		ABWR
	Higashidoori-1	1,385	Dec. 2010	Mar. 2017	Safety Assessment	ABWR
	Higashidoori-2	1,385	FY 2014 or after	FY 2020 or after		ABWR
Chubu Electric	Hamaoka-6	around 1,400	FY2015	FY 2020 or after		ABWR
Chugoku Electric	Shimane-3	1,373	Dec. 2005	Dec. 2011	Under Construction	ABWR
	Kaminoseki-1	1,373	June 2012	Mar. 2018	Safety Assessment	ABWR
	Kaminoseki-2	1,373	FY 2017	FY 2022		ABWR
Kyushu Electric	Sendai-3	1,590	FY2013	FY 2019		APWR
J-Power	Ohma	1,383	May 2008	Nov. 2014	Under Construction	ABWR
Japan Atomic Power Company	Tsuruga-3	1,538	Oct. 2010	Mar. 2016	Safety Assessment	APWR
	Tsuruga-4	1,538	Oct. 2010	Mar. 2017	Safety Assessment	APWR
Total	**14 Reactors**	**19,308**				

1. Table by CNIC based on *FY 2010 Electric Power Supply Plan*

According to this estimate, while there will be progress in energy conservation, "stable growth is forecast against a backdrop of increased base demand associated with progress in the service economy and IT and expansion in the scale of the economy."

Electric power companies decide to construct power stations in response to increased peak demand, so if they don't predict an increase in peak demand, they want to postpone construction of new nuclear power plants.

What do electric power companies do when new nuclear power plants start operating? The answer is clearly shown in the supply-demand balance for each power company. Consider the case of Hokkaido Electric. Tomari-3 started commercial operations in December last year. At the time of FY2010 peak winter demand Hokkaido Electric's surplus supply capacity was 25.4%. (In summer it was 37.2%.) Taking 8% to be a reasonable surplus, it is clear that Hokkaido Electric has excess capacity. Hence, it is predicting an increase in peak demand of 1.2% per annum - three times the national average - over the next 10 years. It is desperately promoting "all electric" housing. Even then, it still predicts that surplus supply capacity in FY2019 will be 11.3% in winter and 18.1% in summer.

In other words, power companies must either put even more effort into manufacturing demand for electricity, or they can try to sell their surplus to other power companies. However, since the other power companies predict lower growth in peak demand, Hokkaido Electric will struggle to sell its surplus to them.

Tomari-3 is a relatively small 912MW PWR. Nevertheless, bringing it online led to a capacity surplus. It is not hard to imagine the problem created by starting up a 1400MW ABWR, or a 1600MW APWR. On November 13, 1998, Takashi Furukawa, then Vice President of Chugoku Electric Power Company, bemoaned the predicament of electric power companies during a meeting of an expert committee established by the Electricity Industry Committee. He said, "We have to promote huge power plants at a time when demand for electricity is not increasing,"

Global Warming Deniers

Having to build nuclear power plants is a nuisance for electric power companies, but the reason why they are being asked to do so, namely demands for CO_2 emissions reductions, is an even bigger nuisance. Global warming deniers were fairly restrained in Japan until recently. However, since scandals involving the Intergovernmental Panel on Climate Change emerged, articles have appeared frequently in electricity industry magazines. The articles have a peculiar pro-nuclear twist, but they claim that energy conservation for the sake of CO_2 emissions reductions is undesirable because it means falling demand for electricity. The focus, they say, should rather be on "energy security".

Every nuclear accident is accompanied by a massive loss of electric power supply capacity. Hence, large-scale nuclear power plants actually threaten stable electricity supply. But the industry covers up the fragility of electricity supply systems that are highly dependent on nuclear power. Instead, it pushes the energy security argument by emphasizing the large output of nuclear power plants. On the surface it promotes nuclear power, but the real aim is to increase demand for electricity.

Baku Nishio (CNIC Co-Director)

Continued from page 4 endorsed.

The people in the audience were very disappointed. They wondered what was the point of having such a technical committee. In particular, those who had followed the earnest deliberations in the subcommittees had a feeling of futility.

The next steps of the prefecture and its nuclear safety office are under question. Are they capable of holding a public hearing with any substance? There is no clear basis for a judgment by the governor.

Yukio Yamaguchi (CNIC Co-Director)

*1 Gal = 0.01 m/s^2.

Continued from page 5 a result of repeated scandals and their inability to reform themselves. It is no surprise then when people conclude that such companies should not be allowed to operate their existing nuclear power plants, let alone build new ones.

Hideyuki Ban (CNIC Co-Director)

2010 Plutonium Utilization Plans and Plutonium Holdings

On March 16 the electric power companies reported their plutonium utilization plans for the 2010 fiscal year to the Atomic Energy Commission (AEC). They also published data on the quantity of separated plutonium they own. The data was published in 100-kilogram units of fissile plutonium, but in response to requests from the general public, for the sake of transparency companies verbally provided kilogram quantities for their plutonium utilization plans. (A summary prepared by CNIC, including data provided verbally, is shown in the table on page 11.)

Most power companies only provided figures in 100-kilogram units for plutonium held overseas and plutonium held at Japan Atomic Energy Agency's (JAEA) Tokai facility, despite requests from the public for data in kilograms. Hokkaido Electric and Shikoku Electric gave some additional information verbally. Hokkaido Electric said that it owned 90kg of fissile plutonium stored in Europe. Shikoku Electric only said that it owned 35kg of plutonium stored in France.

Data should be published by all companies in writing in kilogram units for all separated plutonium, wherever it is held.

Allocation of plutonium stored in the UK was not complete at the end of 2009, so this figure will increase slightly in future. Another point to note is that in November 2009 seven electric power companies signed contracts with J-Power to provide it with plutonium separated in France for use in its Ohma Nuclear Power Plant. A total of 1.3 tons will be provided by the seven companies as follows: Tohoku 0.1 tons, Tokyo 0.7 tons, Chubu 0.1 tons, Hokuriku 0.1 tons, Chugoku 0.2 tons, Shikoku 0.0 tons (less than 500kg), Kyushu 0.1 tons.

JAEA has 3,145kg of plutonium at its Tokai Reprocessing Facility. Of this, 348kg has been made into fuel. This year it plans to recover 0.01 tons of plutonium by reprocessing 5 tons of spent fuel. It plans to use 171kg of fissile plutonium this fiscal year to test its Monju Fast Breeder Reactor up to 40% power output.

The Rokkasho Reprocessing Plant is scheduled to begin commercial operations in October and to reprocess 80 tons of spent fuel this fiscal year. Some companies' holdings of fissile plutonium will increase even though their spent fuel will not be reprocessed this fiscal year. The reason for this is that plutonium will be allocated based on the quantity of fissile plutonium contained in spent fuel delivered to the Rokkasho Reprocessing Plant, regardless of which company's spent fuel is actually reprocessed.

The plutonium utilization plans only show fissile plutonium. An AEC Commissioner suggested that total plutonium should be published too. In Japan's inventory of separated plutonium, which is published around September each year, total plutonium is shown for plutonium held in Japan at the end of the calendar year (see NIT 133 for Dec. 2008 inventory). Plutonium held overseas is only given in fissile plutonium and only fissile plutonium is given for the overall sum of plutonium stored in Japan and overseas. All of these figures should be given for both fissile and total plutonium.

Hideyuki Ban (CNIC Co-Director)

Continued from page 14 Naoshima said, "The working group (launched by Japan and India) will not be an organization to discuss a nuclear pact....The conclusion of the pact is necessary. It will be discussed in a different framework."

In Tokyo, about 30 Japanese NGO leaders sent a protest statement to the government on the same day that the ministers were meeting in New Delhi. They pointed out the irony of beginning discussions on nuclear cooperation with India just as the NPT Review Conference was about to get under way in New York. They questioned the government's ability and will to play a leadership role in nuclear abolition and called on it to restrict its energy cooperation with India to areas such as renewable energy and energy conservation.

The representatives of Japanese nuclear plant makers Toshiba, Mitsubishi and Hitachi were present during the energy dialogue. The Indian Government has allocated sites for Toshiba-owned Westinghouse and GE-Hitachi to build nuclear power plants, but it will be virtually impossible for these US-based companies to proceed without using Japanese industry and technology.

Electric Power Companies' Plutonium Holdings (end 2009) and Plutonium Utilization Plans (FY2010)

Company	Held O'seas 31 Dec '09	Held at Tokai 31 Dec '09	Held at Rok. 31 Mar '10	Held at NPP 31 Dec '09	Recover at Rok. FY2010	Hold at Rok. 31 Mar '10	Estimated Annual Use
Hokkaido	0.1		0.072		0.015	0.087	0.2
Tohoku	0.3	0.0	0.078		0.016	0.094	0.2
Tokyo	7.2	0.1	0.748	0.3	0.142	0.890	0.9 - 1.6
Chubu	2.2	0.1	0.182	0.1	0.036	0.217	0.4
Hokuriku	0.1		0.009		0.002	0.010	0.1
Kansai	8.4	0.2	0.556		0.114	0.670	1.1 - 1.4
Chugoku	0.7	0.0	0.084		0.017	0.101	0.2
Shikoku	0.7	0.1	0.133	0.6	0.027	0.160	0.4
Kyushu	1.4	0.1	0.315		0.059	0.373	0.4
JAPCO	3.1	0.1	0.140		0.027	0.167	0.5
J-Power							1.1
Total	24.1	0.7	2.317	1.0	0.452	2.770	5.5 - 6.5
		Held by JAEA end 2009			Recover at Tokai FY10	Hold by JAEA end FY10	
JAEA		3.145			0.01	2.986	Joyo 0.1 Monju 0.5

All figures in tons fissile plutonium. Figures rounded, hence some are '0.0'.

Taken from reports by electric power companies' and JAEA submitted to Atomic Energy Commission 16 March 2010. Reports of plutonium holdings at 31 Dec. 2009 and plutonium utilization plans for 2010 fiscal year (1 April 2010 - 31 March 2011).

Group Introduction

Rainbow Kayak Squadron

By Ramboh*

The Rainbow Kayak Squadron is a group of concerned individuals, including local outdoor guides and people from around Japan. Each member acts voluntarily in the belief that the Kaminoseki Nuclear Power Plant[1] is a personal issue for himself or herself.

The basic starting point of the Rainbow Kayak Squadron is respect for the people of Iwaishima Island, who have protected the sea until now, and the members' desire to take whatever autonomous action they can today, in order to protect the things that will be lost as a result of construction of the Kaminoseki Nuclear Power Plant.

Each day we engage in onsite action to express our opposition to Chugoku Electric Power Company's reclamation of the sea around Tanoura, the site of the nuclear power plant, and help the Iwaishima Islanders with activities such as packing loquat leaf tea.

Thus, in the course of our daily lives we find our own roles and develop mutual trust by respecting each other's individuality.

Mutual trust has not only developed between members of the Sea Kayak Squadron. Bonds are also developing with the people of Iwaishima and with people from throughout Japan, who have supported our activities in all sorts of ways.

**Ramboh is a member of the Rainbow Kayak Squadron*

Living self-reliantly in harmony with nature

We discover what is truly important through daily encounter with the things that the people of Iwaishima have preserved.

We think that by living in this way a truly bright and sustainable future will reveal itself to us.

And we hope that together, overcoming differences in position and point of view, we will find a way of resolving issues in which everyone can be happy.

1. For more information about the campaign to stop construction of the Kaminoseki NPP see NIT 125 and NIT 133. Also see the article about Chugoku Electric Power Company on page 5.

NEWS WATCH

Japanese Government frantically trying to win nuclear orders from Vietnam

The Japanese government is increasing its lobbying efforts to win nuclear orders from Vietnam. Russia has won a contact to carry out a feasibility study for the first phase of Vietnam's nuclear power plan (2 reactors), but a second phase (2 more reactors) is also planned. Furthermore, the possibility of exporting equipment for the first phase still remains.

On April 12, while attending the Nuclear Security Summit in Washington, Prime Minister Yukio Hatoyama met with his Vietnamese counterpart Prime Minister Nguyen Tan Dung. Hatoyama thanked Dung for his quick reply to his letter of March 3 (see NIT 135) and expressed his intention of soon beginning negotiations for a nuclear cooperation agreement between the two countries. The April 15 edition of the *Atomic Industry Newspaper* (*Genshiryoku Sangyo Shimbun*) reported their exchange as follows.

> Hatoyama: "The Japanese Government wholeheartedly supports Vietnam. Based on our strategic partnership, Japan is prepared to cooperate in Vietnam's introduction of nuclear power. We therefore hope that you will soon choose Japan as a construction partner."
>
> Dung: "I am aware of Japan's keen interest and appreciate Japan's cooperation till now. I highly esteem Japan's high safety standards and its technology. Based on our strategic partnership, I will give serious consideration to Japan's proposal."

Meanwhile, Vietnam's planning and investment minister, Vo Hong Phuc, was visiting Japan. He met Minister of Economy, Trade and Industry Masayuki Naoshima on April 13 and Minister for Foreign Affairs Katsuya Okada on April 14. Phuc, who received similar requests to those from Prime Minister Hatoyama, said in an interview with Jiji Press, "Personally, I strongly hope that Japan will be involved and it is highly likely that it will be involved."

Yoshito Sengoku, Japan's state minister in charge of national policy, announced that he would join a delegation to Vietnam in May by Toshiba, Hitachi, Mitsubishi Heavy Industries, Tokyo Electric, Kansai Electric and Chubu Electric Power Companies to provide government backing.

MOX fuel departs France

On April 8, the specialist ship *Pacific Heron* departed the French port of Cherbourg for Japan loaded with 32 MOX fuel assemblies, 8 for Kansai Electric's Takahama-3 reactor (PWR, 870MW), 4 for Takahama-4 (PWR, 870MW) and 20 for Kyushu Electric's Genkai-3 (PWR, 1180MW). It is scheduled to arrive in Japan in the latter half of June. All the MOX assemblies were fabricated at Areva's Melox factory.

A British security company is supplying armed security guards for the journey. Double the number of guards used for shipments of normal nuclear fuel are on board the Pacific Heron for this MOX shipment. The *Pacific Heron* is being accompanied by the *Pacific Pintail*, which also has armed security guards on board. The two ships will guard each other.

JNFL fails to recover fallen tile

The Rokkasho Reprocessing Plant has been constructed in Rokkasho Village, Aomori Prefecture, but commercial operations have been greatly delayed due to problems with the high-level liquid waste vitrification facility (see NIT 132).

On April 3 Japan Nuclear Fuel Ltd. (JNFL) began an unsuccessful attempt to recover a tile that had fallen from the inner wall of the vitrification furnace. The process began by heating the furnace to melt the remaining glass mixture. A mechanical arm was used to search for the tile, which could not be seen, but before it could pick up the tile the glass solidified again. One after the other, items of equipment used in the recovery effort became unusable and eventually the attempt was suspended on April 21.

Under the original schedule the tile was to be recovered last year. However, new equipment was made and attempts to recover the tile restarted on May 15. Even if the tile is recovered, it is still necessary to remove sediments of metal material

that have accumulated at the bottom of the furnace and to check equipment before the vitrification tests can be resumed.

Clearly it is impossible to meet the October date for completion of the tests. However, in his April 28 press conference JNFL President Yoshihiko Kawai refused to concede, saying, "I don't intend to change the target."

Construction of MOX fabrication plant postponed

Japan Nuclear Fuel Ltd. (JNFL) plans to build a MOX fuel fabrication plant in Rokkasho Village, Aomori Prefecture. The scheduled date for commencement of construction was May this year. However, JNFL President Yoshihiko Kawai announced at his April 28 press conference that it was not possible to meet this schedule.

The Atomic Energy Commission and the Nuclear Safety Commission completed their reviews on April 19 and April 21 respectively for the basic design and construction plan. They gave the Minister for Economy, Trade and Industry the green light to give his approval. He duly obliged on May 13, but JNFL must still submit a more detailed design and construction plan for approval.

MHI to invest in Areva

Mitsubishi Heavy Industries (MHI) is making final arrangements to invest about 50 billion yen in Areva (2% - 3% ownership). It is expected that a final settlement will be reached in May, but the French Government, which owns the shares, is hoping for a high price, so negotiations may still take some time.

The French Government and government-owned agencies own 90% of Areva's shares, but the company's financial base has deteriorated due to huge nuclear-related investments. In June last year Areva adopted a policy of selling up to 15% of the group's capital to overseas companies. It has been soliciting investment from MHI, Middle Eastern sovereign funds and so on.

TEPCO to Invest in US Nuclear Project

On May 10, Tokyo Electric Power Company (TEPCO) indicated its intention of taking a stake in the South Texas Project (STP). NRG Energy and Toshiba plan to build two Toshiba-developed advanced boiling water reactors (ABWR) at the STP site, through their jointly owned company, Nuclear Innovation North America LLC (NINA).

TEPCO will invest $155 million, through its U.S.-based subsidiary, for a 10% share of NINA Investments Holdings' interest in the STP. The $155 million includes a $30 million option payment enabling TEPCO to buy an additional 10% share later. TEPCO is already providing technical consulting services for the project.

TEPCO said its investment depends on the project receiving a conditional commitment from the U.S. Department of Energy for a loan guarantee. TEPCO also hopes for support from the Japanese Government through Japan Bank for International Cooperation (JBIC) and Nippon Export and Investment and Insurance (NEXI).

Nuclear Cooperation with India: Industry trumps Abolition

On April 30 Japan took the first step towards nuclear cooperation with India. Masayuki Naoshima, Japanese Minister for Economy, Trade and Industry, and Montek Singh Ahluwalia, Deputy Chairman of India's Planning Commission, issued a joint statement on energy during the fourth ministerial-level meeting of the energy dialogue between India and Japan.

According to the statement, "The two ministries decided to establish a Nuclear Energy Working Group under the energy dialogue to exchange views and information on their respective nuclear energy policies from the energy, economic and industrial perspectives."

However, before Japan can export any nuclear technology, the two countries must conclude a bilateral Nuclear Cooperation Agreement, in which both parties undertake not to divert nuclear materials and technology for military purposes. Japan has in the past refused to share nuclear technology with India, because it has not signed the Nuclear Nonproliferation Treaty (NPT) and it developed nuclear weapons after the NPT was in place.

Continued on page 10

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